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RESEARCH PAPER

Self-worth, perceived competence, and behaviour problems in children with cerebral palsy

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Abstract

Purpose. To examine the relevance of physical disabilities for self-worth and perceived competence in children with cerebral palsy (CP), and to examine associations between behaviour problems and self-worth and perceived competence.

Methods. The Harter scales for self-worth and perceived competence and a new scale for perceived motor competence were used in a sample of 80 children with CP. Their motor functioning was assessed with the Gross Motor Functioning Measure (GMFM) and behaviour problems with the Child Behaviour Check List administered to parents.

Results. Self-worth and perceived competence for children with CP were comparable to the Dutch norm sample, except for perceived athletic competence. Within the CP sample, the GMFM showed a domain-specific effect on perceived motor competence. In the multivariate analysis, internalizing problems were associated negatively with all perceived competence scales and self-worth, whereas aggression was positively associated with perceived motor competence, physical appearance, and self-worth.

Conclusions. Children with CP appear resilient against challenges posed to their self-worth caused by their disabilities. The relevance of the physical disability appears to be domain specific. For internalizing problems and aggression, different theoretical models are needed to account for their associations with self-worth and perceived competence.

Keywords: Cerebral palsy, self-worth, perceived competence, motor functioning, behaviour problems

Introduction

Self-worth and perceptions of competence have been an important concern within the scientific literature on children with physical disabilities such as cerebral palsy (CP) and spina bifida. A reason for this concern might be that physical disabilities impose limits on attaining successes and accomplishments that children need to develop a positive view of the self [1]. However, empirical studies have found little evidence for differences between children with and without physical disabilities on measures of self-worth, indicating that a general risk model of physical disabilities is too simple [2]. If physical disabilities play a role in the development of cognitions on the self, it will have to be described using more complex theoretical models.

According to Harter [3], two types of cognitions about the self are important: global sense of

self-worth (often also referred to as self-esteem) and perceived competence within distinct domains of functioning. Perceived competence in a given domain would at least partly be the result of the feedback a child gets on his functioning in that particular domain. This feedback could be social (peers, family, professionals) or nonsocial (the child's own assessment of success in a given activity). Global self-worth results from an amalgam of social and psychological processes, but is partly based on perceptions of competence in particular domains of development. Domains of functioning that are deemed as most important given age and situation would also have the strongest influence on global self-worth.

Although the number of studies comparing children with physical disabilities to children without disabilities is still relatively small, especially for making generalizations across disease groups, the

general consensus is that physical disabilities are not a major risk factor for the development of low self-worth [2,4–6]. Findings are more divergent with respect to perceived competence within specific domains. Most studies have found that children with physical disabilities rate their athletic competence as relatively low [4,6–8] but one study did not find a difference in perceived physical ability [5]. Within other domains (scholastic competence, social acceptability, physical appearance, romantic appeal) the patterns of differences between children with and without physical disabilities are more equivocal. These findings have been interpreted as support for Harter's theory that perceived competence is a domain specific construct, whereas global self-worth might reflect a more general psychological process. Some authors have interpreted these findings as indicating that children with physical disability are highly resilient, being able to maintain positive self-worth even while recognizing that their competence is limited in areas directly affected by their disease [2,9].

Although the evidence is compelling that children with physical disabilities show as a group resilience against possible risk to their self-worth, there are also individual differences to consider. Research in this area is more sparse. A study of adolescents with CP [10] found that functional ability, female gender, perceived parental overprotectiveness, and perceived impact of the disease all were bivariate associated with global self-worth, but that in a multivariate analysis only perceived impact of the disease remained as a significant predictor. Individual differences in self-worth have been found associated with internalizing behaviour problems (depression, anxiety, withdrawal, somatization) in children with chronic physical diseases [11] and with spina bifida [12]. No studies were found examining individual differences in self-worth and perceived competence in relation to behaviour problems in samples of children with CP.

It seems highly likely that also in children with CP internalizing behaviour problems would be negatively associated with self-worth and perceived competence, because the underlying internalizing syndromes of depression, anxiety, withdrawal, and somatization seem to share a negative bias with respect to the ability of the self facing up to the world. Whether behaviour problems of the externalizing type (delinquency, aggression) would be related to self-worth and perceived competence is unclear, however. Externalizing problems have not received much attention with respect to children with physical disabilities. However, debate has been going on in the literature on children without disabilities about a possible *positive* association between on the one hand self-worth and perceived competence and

on the other hand externalizing behaviour problems, aggression in particular. Some authors have theorized that an overly optimistic view in the face of one's actual abilities may reflect fragility of the self-system [13]. A fragile self-system might make the person anxious to defend him- or herself to challenges by using threats or actual aggression to impress others. Indeed, narcissism as indicated by unrealistically positive self-perceptions predicted aggression in adolescents [14]. It is not known whether high perceived competence in areas affected by a disease, especially if the perceived competence is high compared to other children with similar functional limitations, would be associated with aggressive behaviour.

The aim of the present study was to examine the relationship between self-worth, self-perceived competence and CP. To that end, children with and without CP were compared, and multivariate analyses were attempted of individual differences within the group with CP. With respect to group differences, we expected to find no differences in global self-worth between children with and without CP. We did expect differences between these groups with respect to perceived competence within the domain most directly affected by disease, namely athletic competence. With respect to individual differences, we expected that the level of motor functioning, which is the most discriminating aspect of CP, would show domain-specific effects on perceived competence. A new subscale for perceived motor competence was therefore added to the existing perceived competence scales. We did not expect an effect on global self-worth. Finally, we tested whether internalizing behaviour and aggression would contribute to the prediction of self-worth and perceived competence. Of specific interest was the association between aggression and perceived motor competence, because this is the part of the self-system most directly challenged by the CP, and because we could control for actual competence using an objective measure of motor functioning.

Method

Participants

The participants were recruited for a longitudinal study of 3 years. All rehabilitation centres, special schools for physically and mentally disabled children and departments of rehabilitation medicine of outpatient clinics in the northwestern region of The Netherlands identified children with CP aged 9, 11 and 13 years. Of 244 children, 110 children and their parents returned the consent form with a positive response. Reasons for non-participation could be determined in 20 cases: language problems (four), moved without forwarding address (two),

participation in other research (two) and family stress (12). Given the percentage of children from immigrant families within the patient population, language and cultural barriers might be suspected as a reason for non-participation. Children with one or more parents born in non-western countries (Turkey, Africa, South-America, and Asia, excluding Indonesia and Japan) were somewhat underrepresented in our sample (16.4%) compared to the percentage of 10–15-year-old children of non-western descent in the North-Holland province (24% according to the Nation Demographics Center at statline.cbs.nl). Ethical approval for the study was given by all regional committees for Medical Ethics (according to the Helsinki Convention). Of the total group of 110 children, 80 participated in the administration of the self-perception profile for children, which was filled out by the child under supervision of an investigator or read by the investigator to the child. A pictorial version of the self-perception profile does exist for younger children or children with less reading and comprehension skills than 9–15-year-olds [15], but the scales derived from these versions are not completely the same and therefore the instruments were deemed not comparable.

Instruments

Gross motor function. The Gross Motor Function Measure (GMFM) is a widely-used standardized observation instrument that has been developed for children with CP to document change in gross motor function over time [16,17]. The GMFM requires observation of the achievement of a variety of gross motor activities (mainly mobility skills and activities requiring postural control such as sitting, kneeling, and standing on one foot). The GMFM was analysed using the Gross Motor Ability Estimator computer scoring programme (GMAE) to get the GMFM-66 score based on a subset of 66 items from the complete GMFM [17]. The GMAE rescales the child's abilities from an ordinal scale to an interval scale from zero to one hundred. Several studies have documented the excellent reliability and criterion validity of the GMFM and the GMFM-66 [16–19].

Self-worth and perceived competence. The scales for perceived competence and for global self-worth were derived from a Dutch version of Harter's Social Perception Profile for Children (SPPC) scale [20], as developed by Vermeer for use with children with CP [21]. In this version, a motor competence subscale replaces the behaviour conduct subscale. The motor items describe specific motor activities, namely kicking a ball, catching a ball, throwing a ball, bouncing a ball, running, jumping, swimming, cycling. The remaining subscales are aimed at

athletic competence (e.g., 'good at sports'), physical appearance (e.g., 'satisfied with own looks'), social acceptance (e.g., 'easy to make friends'), scholastic competence (e.g., 'do well in school'), and global self-worth (e.g., 'satisfied with being who you are'). Each item in the SPPC consists of two statements describing opposites. An example from the motor scale is the item 'Some children are very good at catching a ball' coupled to 'Other children are not so good at catching a ball'. Children have to choose the description they think fits them best and then indicate whether the description is somewhat true or very true. Each item receives a score between 1 and 4, with higher scores corresponding to a more positive perception of a specific competence. Scale scores were calculated by summing the items. Adequate reliability and content validity with samples of children with and without disabilities has been reported [22].

Although the Vermeer version has an expanded set of eight items per subscale instead of the usual six, we only used those six items which have been used in most other studies with the SPPC to facilitate comparisons [23,24]. For motor competence, we used all eight items, but recalculated the scale scores so these would be comparable to the other scales. Veerman et al. as well as Muris et al. found evidence for internal consistency, test–retest reliability, as well as construct validity of the Dutch versions of the SPPC in large non-disabled samples. Evidence that supports that comparisons can be made between physically disabled and non-disabled groups using the SPPC was provided by a study that demonstrated that the underlying factor structure of the SPPC was the same for children with and without spina bifida [25]. Internal consistency coefficients in the current sample were all 0.75–0.76, except for the scale for athletic competence, which had a coefficient of 0.63.

Behaviour problems. Parents (mostly mothers) completed the Dutch version of the Child Behaviour Check List (CBCL; [26,27]). The CBCL consists of 113 items describing a broad range of childhood (age 4 through 18) behaviour problems. We used the broad band scale for internalizing problems, which is composed of subscales withdrawn (e.g., 'prefers to be alone', 'shy'), somatic complaints (e.g., 'dizziness', 'headache'), and anxious/depressed problems (e.g., 'feels lonely', 'unhappy'), and we used the aggressive behaviour scale (e.g., 'cruel to others', 'fights', 'argues a lot'). The Dutch version of the CBCL has shown good reliability (internal consistency and test-retest) in nationally representative and clinical samples, and factor analyses have confirmed the cross-national comparability of the syndrome-scales [28]. Cronbach's α in the current sample was

0.89 for the 31-item internalizing behaviour problems scale and 0.87 for the 20-item aggressive behaviour scale.

Data analysis

Group differences between children with and without CP on self-worth and perceived competence were tested in a series of *t*-tests. Because the sample variances appeared significantly unequal on several comparisons, Welch-*t* was used to test for differences. To examine individual differences, a series of hierarchical multiple regression analyses was conducted with each of the perceived competence scales and self-worth as dependent variables. The first predictor was the GMFM score. In the second step, internalizing behaviour problems and aggression were entered. Because the distribution of scores for the GMFM, aggressive behaviour, and internalizing behaviour problems were positively skewed and peaked, the raw scores were transformed by taking the square root (for the GMFM, first the raw score was subtracted from 101, then the sign was reversed to maintain the same direction for the scale scores). After this transformation, kurtosis was within the bounds of what is recommended for multivariate analysis (between -1 and 1 [29]). Skewness remained somewhat problematic for the GMFM (skewness dropped from 1.9 to 1.4), probably reflecting the bias of the study sample towards the less afflicted children with CP. Bivariate associations were examined between the dependent and independent variables and background characteristics (age, sex, special education or mainstream). None of these background characteristics was significantly ($p < 0.10$) associated with both the dependent and the independent variables for each of the planned multiple regression analyses. Therefore these background analyses were not included as covariates.

Results

Preliminary analyses

In Table I the background characteristics of the study sample as well as the descriptives of the independent variables are summarized. In order to examine possible selection bias as a result of using self-report for self-worth and perceived competence, the study sample was compared to the children from the original sample who did not participate in this part of the study. The significant effects for school type (special education or mainstream), localization of the cerebral palsy (hemiplegia, diplegia or quadriplegia), motor functioning, and aggression indicate that the results of the study may only apply to less severely disabled children and children showing less aggressive behaviour problems, and that restriction of range may have limited effect sizes.

Self-worth and perceived competence of children with cerebral palsy

In Table II means and standard deviations can be found of the scales for perceived competence and self-worth for the study sample of children with CP. Comparison data are drawn from a Dutch normative sample (ages 8–12, mean age 10 years [23]). None of the self-perception scales in the CP sample proved significantly associated with age of the child in a correlational analysis, and with sex, school type (mainstream versus special education), and localization of the CP in an analysis of variance ($p > 0.05$). However, because a sex difference was found in the normative sample, Table II reports for boys and girls separately. Self-worth and perceived competence of children with CP appeared quite similar to normative Dutch children of similar ages, except for perceived athletic competence, which was significantly lower for children with CP.

Table I. Demographic and disorder characteristics of the study sample ($n = 80$) and the non-participating sample ($n = 30$).

	Study sample	Non-participating sample	Difference test statistic
Age (years)	11.17 (1.70)	11.40 (1.59)	$F(1, 109) = 0.41$
Sex (male %)	61.3	69.0	$\chi^2 = 0.55$
Non-western descent (%)	16.3	16.7	$\chi^2 = 0.00$
Special education (%)	42.5	100	$\chi^2 = 28.05^{***}$
Localization (%)			$\chi^2 = 41.86^{***}$
Hemiplegia	51.3	6.7	
Diplegia	43.8	36.7	
Quadriplegia	5.0	56.7	
GMFM	86.50 (23.30)	39.77 (34.40)	$F(1, 109) = 66.67^{***}$
Internalizing problems	9.43 (8.31)	9.97 (8.10)	$F(1, 109) = .09$
Aggression	6.81 (5.15)	10.10 (7.39)	$F(1, 109) = 6.80^*$

* $p < 0.05$; *** $p < 0.001$.

Associations between self-evaluation, severity of the physical disability and behaviour problems

Bivariate associations (see Table III) were found between internalizing behaviour problems and self-worth and perceived competence except perceived motor competence. Aggressive behaviour was not significantly associated with self-worth or perceived competence. Internalizing problems and aggressive behaviour were significantly associated. The GMFM was not significantly associated with internalizing problems or aggression.

Table IV shows the results of the series of hierarchical multiple regression analyses on perceived competence and self-worth. As the bivariate analyses also showed, the level of motor functioning indexing the severity of the cerebral palsy, measured by the GMFM, was only associated with perceived motor competence, not with any of the other perceived competence scales. Parent-reported internalizing behaviour and aggression contributed significantly to the prediction of perceived motor competence, over and above the effect of motor functioning. For global self-worth, an unexpected negative association was found between the GMFM and self-worth when internalizing problems and aggression were included in the analysis. Overall, internalizing problems were consistently negatively associated with perceived

competence and self-worth, with effect sizes ranging from moderate to strong (Cohen's criteria indicate that Pearson correlation coefficient effect sizes may be interpreted as moderate if effect sizes range between 0.30 and 0.50 and strong if effect sizes exceed 0.50 [30]). While aggression was not significantly associated with perceived competence and self-worth in the bivariate analyses, aggression emerged as significantly and positively associated with perceived motor competence, perceived physical appearance, and global self-worth once GMFM score and internalizing problems were taken into account. Positive associations between aggression and perceived athletic competence and perceived social acceptance were significant at the trend level.

Discussion

Children with CP indicated on average a similar level of global self-worth as children from a Dutch norm group [23]. As expected, only with respect to athletic activities and sports, children with CP rated their competence as lower than the Dutch norm sample. These findings applied to children with CP who were able to answer to self-report questions on self-worth and perceived competence. The same results may not apply to more severely affected children.

Analyses of individual differences in self-worth and perceived competence also largely confirmed the

Table II. Self-worth and perceived competence (means and SDs) of boys and girls with CP compared to normative Dutch children from Veerman et al.

	Boys			Girls		
	CP (<i>n</i> = 49)	Normative (<i>n</i> = 180)	<i>t</i>	CP (<i>n</i> = 31)	Normative (<i>n</i> = 181)	<i>t</i>
Motor competence	18.15 (4.21)			16.67 (3.90)		
Athletic competence	15.99 (4.08)	18.70 (3.32)	4.28***	14.74 (3.94)	17.55 (3.16)	3.77***
Social acceptance	17.60 (5.02)	17.78 (3.80)	0.23	17.90 (4.41)	17.45 (3.55)	-0.54
Physical appearance	19.32 (4.53)	20.06 (3.64)	1.06	18.61 (4.07)	18.91 (4.23)	0.38
Scholastic competence	17.48 (4.67)	17.36 (3.53)	-0.17	17.06 (4.25)	16.29 (3.38)	-0.96
Global self-worth	20.54 (3.96)	20.01 (2.95)	-0.87	19.65 (4.00)	19.36 (3.17)	-0.38

Note: Unequal variances assumed, Welch-*t* is reported.

****p* < 0.001.

Table III. Bivariate associations between dependent (self-worth and perceived competence) and independent (GMFM, CBCL) variables (*n* = 80).

	2	3	4	5	6	7	8	9
1. Motor competence	0.63**	0.33**	0.15	0.29**	0.17	-0.16	0.15	0.32**
2. Athletic competence		0.39**	0.31**	0.39**	0.30**	-0.26*	0.04	0.09
3. Social acceptance			0.44**	0.19	0.44**	-0.31**	0.00	0.14
4. Physical appearance				0.25*	0.81**	-0.31**	0.08	-0.08
5. Scholastic competence					0.28*	-0.41**	-0.21	-0.03
6. Global self-worth						-0.34**	0.03	-0.21
7. Internalizing							0.52**	0.01
8. Aggression								-0.07
9. GMFM								

p* < 0.05; *p* < 0.01.

Table IV. Beta values on the second step of hierarchical regression analyses for GMFM, internalizing behaviour, and aggression predicting perceived competence and self-worth ($n = 80$).

	GMFM	Internalizing	Aggression	R^2
Motor competence	0.31**	-0.29*	0.33**	0.20**
Athletic competence	0.08	-0.36**	0.22+	0.11*
Social acceptance	0.12	-0.40**	0.21+	0.14**
Physical appearance	-0.10	-0.46***	0.30*	0.17**
Scholastic competence	-0.07	-0.41**	-0.02	0.17**
Global self-worth	-0.24*	-0.49***	0.25*	0.23***

Note: Beta values are reported from the second and final step of the hierarchical regression analysis only. The first step only included the GMFM. ΔR^2 for step 2 (adding internalizing behaviour and aggression) was 0.10 for motor competence, 0.10 for athletic competence, 0.12 for social acceptance, 0.17 for physical appearance, 0.17 for scholastic competence, and 0.18 for global self-worth (all p values < 0.05).

+ $p < 0.10$; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

expectations. Perceived competence in the domain of motor functioning was positively associated with gross motor functioning. Other domains appeared unaffected by motor functioning, confirming the domain-specificity of the perceived competence concept [3]. Furthermore, global self-worth appeared unaffected by motor functioning in the bivariate analysis. As expected, parent-reported internalizing behaviour problems predicted lower child-perceived competence across domains and lower self-worth. Interestingly, aggression emerged as a predictor of higher motor competence, more attractive physical appearance, and higher self-worth, once GMFM and internalizing problems were taken into account. The positive effect of aggression on self-perceived motor competence is especially important, because within this domain the GMFM was a highly relevant objective measure of actual competence. These results indicate that not only low but also high perceived competence and self-worth scores may reflect undesirable psychological states or traits.

The current study demonstrates that the associations between perceived competence and self-worth and internalizing problems also can be found for children with CP. Self-report studies of children with chronic physical disorders [11] and children with spina bifida [12] have found similar associations between internalizing problems and self-worth. These results confirm the appropriateness of clinical attention to low self-worth and perceptions of competence [31]. The positive association of perceived competence (motor and physical appearance)

and self-worth with aggression is a new finding. Previous studies did not examine aggression in relation to self-worth [12] or examined associations only bivariate [11]. The results of the current study should therefore be replicated in other studies before more definitive conclusions can be drawn.

If the positive association of aggression with self-worth and perceived competence appears robust, it would support the theories proposed on the basis of laboratory studies of aggression. These studies have found that individuals with narcissistic tendencies, who might entertain unrealistically positive self-evaluations, can be easily provoked into interpersonal aggression [32,33]. A direct empirical comparison of these contrasting theoretical views showed that self-worth was negatively associated with aggression, whereas narcissistic trait was positively associated with aggression [14]. Although we did not measure narcissistic trait directly, the association between aggression and perceived competence in our sample emerged after actual competence (as indicated by the GMFM) as well as internalizing problems were taken into account, which leaves the possibility open that the remaining variance in the externalizing behaviour scores and within the self-perceived competence scores might reflect the same underlying narcissistic source. These findings indicate that some children with CP paint a more positive picture of their motor capabilities than warranted by their gross motor test scores. These same children are perceived by their parents as being relatively aggressive, and not at all withdrawn, anxious, or depressed. The findings for the other domains were in the same direction but weaker, which might be explained by the fact that gross motor functioning was not a particularly relevant index of actual performance. Aggressive tendencies in the eyes of parents might partly be explained by an inflated but vulnerable sense of self that is expressed in a tendency to behave aggressively.

Unexpectedly, no association was found between motor functioning (GMFM) and perceived athletic competence, in spite of the significant group difference between children with and without CP. Future research might take into account to what extent children with CP participate in adapted sports activities, and how this affects their perceived athletic competence. One other finding worth remarking on was that gross motor functioning was negatively associated with global self-worth. The effect appeared only if behaviour problems were taken into account, but it also bordered on significance in the bivariate analysis. Several explanations could be given. One explanation might be that more severely disabled children receive more positive feedback and less negative feedback in general, boosting their self-worth but not necessarily their self-perceived

competence in concrete domains of functioning. This finding indicates that the processes compensating for possible negative effects on global self-worth in children with CP may be especially strong if the disability is more severe.

Study limitations and directions for further research

The comparison between children with and without CP was done across two investigations and two time periods. The general lack of differences between the two groups could be the result of cohort effects. However, comparisons between the average scores of Dutch children in studies reported in 1996 [23] and 2003 [24] do not reveal those trends. Another limitation is that the study findings are based on cross-sectional data. The choice was made to analyse self-worth and perceived competence as dependent variables and motor functioning and behaviour problems as independent variables. This choice was made for analytic purposes, not because of presumed unidirectional causal effects from the independent to the dependent variables. Longitudinal and experimental studies are needed to determine the extent to which the associations found reflect reciprocal causal influences or reflect predominant influences in one causal direction. Another choice was to focus on the extent to which CP influences the gross motor functioning of children, because this is the domain of functioning which most affected in children with CP. CP also impacts on other domains, such as intellectual functioning, which may also be examined as disabilities caused by the disease affecting perceived competence and self-worth. Because for children with intellectual disabilities a different version of the self-perception profile is needed than for children who function intellectually in the normal range [34], it was decided for this study to focus on a sample which was comparable with respect to the measurement instruments used.

A final note on further research concerns the effect of interventions aimed at enhancing the self-worth of children with CP. On the one hand, children with internalizing difficulties seem to ask for compensatory positive feedback to their negative thoughts and feelings about themselves. Parental overprotectiveness, which has been found to be elevated in parents of children with spina bifida [35] and which was found to be bivariately (but not multivariately) associated with self-worth in children with CP [10], would send the wrong message to children that they are not able on their own to stand up to demands and challenges. On the other hand, Baumeister et al. warned that some people may have 'too much' self-worth, built upon incoherent and fragile ideas about the self [13]. The current findings suggest that interventions by parents and professionals would

be most successful in preventing psychosocial problems in children with CP if they help to strengthen the self-system and make it more coherent. According to Harter's differentiated model of the self [3], this may be done by correcting perceived competence to a more realistic level in areas in which children are prone to be confronted in the real world by limitations posed by their disability, while at the same time maintaining a positive and accepting attitude to the child as a person. Instead of interventions aimed at universally increasing perceived competence in all children with disabilities, interventions are needed which take the level of perceived competence relative to actual competence as the point of departure. To measure the effectiveness of such interventions, the level of perceived competence does not suffice as an outcome measure except when it is interpreted in relation to actual competence.

Conclusion

Like children without disabilities, children with CP maintained in general a positive self-worth and perceived their competence as adequate to meet the demands and expectations appropriate to their developmental stage. Low self-worth and low perceived competence across domains was associated with internalizing behaviour problems. Only perceived motor competence could be partly explained by an objective measure of motor functioning. Parent reported aggressive behaviour by the child was associated with higher perceived competence and self-worth when motor functioning and internalizing problems were taken into account. These findings, if confirmed in further research, might lead to a more individualized approach of intervening to enhance psychosocial functioning of children with cerebral palsy.

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